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14. ABSTRACT

Purpose: The major aim of this evidence based practice (EBP) project was to continue the development of the Evidence-Based Protocol: The Back to Basics Bundle of Nursing Care (BBBNC) while simultaneously determining the effectiveness of the evidence-based intervention, "Back-to-Basics (BTBI)".
Design: A multiple time series design was used to evaluate the effectiveness of the intervention. Outcomes of interest included Staff Knowledge, Patient Satisfaction with Nursing Care, Skin Integrity, Sleep Quality, Pain Intensity, Infection Rates, and the contribution of BBBNC elements to these outcomes.
Methods: The Iowa Model of Research Practice to Promote Quality Care (Titler, et al, 2001) was used to guide the project. The major aim was accomplished through synthesis of the literature while simultaneously determining the effectiveness of the BBBNC and BTBI. **Sample**: The patient sample included all patients receiving nursing care over a seven-month period on three inpatient wards that organizationally made up the Medical Surgical Nursing Department at a military medical center in southern California. The final sample consisted of 1,795 males with a mean age of 51 years and 1,511 females with a mean age of 54 years. **Analysis**: Descriptive and inferential statistics (e.g., ANOVA, multiple regression), were used to evaluate clinically and statistically significant ($p < .05$) differences over time. Feasibility and cost benefit were also assessed. **Findings**: Statistically significant ($p < .05$) differences (main effects) were found for Staff Knowledge, Skin Integrity, Hours of Sleep, and BBBNC elements; significant changes were also found for Patient Satisfaction with Nursing Care with exploratory techniques. There was a decrease in mean Pain Intensity and Infection Rate; however, they did not reach statistical significance. **Implications for Military Nursing**: The BTBI and BBBNC are feasible and effective for use in military hospital environments and may have application in deployed and civilian healthcare settings; further evaluation is necessary.

15. SUBJECT TERMS
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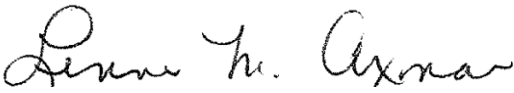
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Abstract

Purpose: The major aim of this evidence based practice (EBP) project was to continue the development of the Evidence-Based Protocol: The Back to Basics Bundle of Nursing Care (BBBNC) while simultaneously determining the effectiveness of the evidence-based intervention, "Back-to-Basics (BTBI)".

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Sample: The patient sample included all patients receiving nursing care over a seven-month period on three inpatient wards that organizationally made up the Medical Surgical Nursing Department at a military medical center in southern California. The final sample consisted of 1,795 males with a mean age of 51 years and 1,511 females with a mean age of 54 years.

Analysis: Descriptive and inferential statistics (e.g., ANOVA, multiple regression), were used to evaluate clinically and statistically significant ($p < .05$) differences over time. Feasibility and cost benefit were also assessed.

Findings: Statistically significant ($p < .05$) differences (main effects) were found for Staff Knowledge, Skin Integrity, Hours of Sleep, and BBBNC elements; significant changes were also found for Patient Satisfaction with Nursing Care with exploratory techniques. There was a decrease in mean Pain Intensity and Infection Rate; however, they did not reach statistical significance.

Implications for Military Nursing: The BTBI and BBBNC are feasible and effective for use in military hospital environments and may have application in deployed and civilian healthcare settings; further evaluation is necessary.

TSNRP Research Priorities that Study or Project Addresses
Primary Priority

Force Health Protection:	☐ Fit and ready force ☐ Deploy with and care for the warrior ☐ Care for all entrusted to our care
Nursing Competencies and Practice:	☐ Patient outcomes ☐ Quality and safety ☒ Translate research into practice/evidence-based practice ☐ Clinical excellence ☐ Knowledge management ☐ Education and training
Leadership, Ethics, and Mentoring:	☐ Health policy ☐ Recruitment and retention ☐ Preparing tomorrow's leaders ☐ Care of the caregiver
Other:	☐

Secondary Priority

Force Health Protection:	☐ Fit and ready force ☐ Deploy with and care for the warrior ☐ Care for all entrusted to our care
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Achievement of Specific Aims of the Study or Project

This Evidence-Based Practice Project addresses questions about the delivery of basic nursing care historically described as AM and PM. This project was relevant to the TriService Nursing Research mission and priorities: Translating Knowledge & Research Findings into Practice in a Military Context and Developing & Sustaining Military Nursing Competencies.

Primary Aim. The primary aim of this EBP was to continue the development of the Evidence-Based Practice Protocol: The Basic Bundle of Nursing Care using methodologies as described by Titler and Adams (2005). This primary aim was accomplished by meeting the following objectives:

Objective 1. Perform an Effectiveness Evaluation of the Basic Bundle of Nursing Care
Objective 2. Perform a Feasibility Evaluation of the Basic Bundle of Nursing Care
Objective 3. Perform a Cost Analysis of the Basic Bundle of Nursing Care Intervention

All analyses were considered significant at $p < .05$ unless otherwise stated. Analysis began with a description of each variable and an evaluation for normality. Normality was assessed using visual and statistical techniques. In those cases in which normality was violated, the data were examined for outliers. In those cases in which data were found to have violated the assumptions of normality, but were considered minimal, parametric tests were performed; conversely, in those situations in which violations were not considered minimal, nonparametric statistical techniques or exploratory modeling using bootstrapping were used (Bond, 2015; Plichta & Kelvin, 2013).

Description of Setting

The medical center was (and is) considered one of the most technologically advanced military medical treatment facilities. This facility provides care to the operational forces, their families, and to those who served their country in the past; this care is provided by a military and civilian staff of more than 8,000. Access to the necessary support services is readily available for computers, copiers, and media graphics. A large medical library with interlibrary loan capabilities was located next to the Nursing Research and Analysis Department (NR&A), which had three full-time doctorally prepared nurses and one research assistant. Additionally, NR&A enjoyed the benefit of three part-time doctorally prepared nurses, multiple EBP teams headed by masters prepared clinical nurse specialists, and numerous graduate students.

The Staff Education and Training Department (SETD) at the medical center was headed by a doctorally prepared nurse in public health program evaluation. The SETD boasted three divisions, one of which was devoted to nursing education, which had one active duty and four full time clinical nurse educators. The medical center provided a scholarly environment in which research and evidence-based practice was encouraged and expected from students, residents, and staff. The principle investigator (PI) was a member of the IRB and frequently consulted on graduate nursing and medical research projects

The patient sample included all patients receiving nursing care over a seven-month period on three inpatient wards that organizationally made up the Medical Surgical Nursing Department at a military medical center in southern California. Data were collected on an ongoing basis as part of the daily basic nursing care for medical-surgical inpatients in their hospital rooms.

Because, the care that was provided was considered standard of care and could be found in the medical center On-Line Manual Procedures 2.2 (Lippincott, Williams, & Wilkins, 2005), patients were not consented; and a waiver of consent (Exempt status) was received from the medical center IRB. When the infrequent case arose, in which a patient did not wish to have elements of basic nursing care provided, those elements of care were not provided, as is the current practice.

Nursing care providers (nursing staff) on the medical-surgical wards at the medical center included Hospital Corpsmen (HMs), Licensed Vocational Nurses (LVNs), and Registered Nurses (RNs) of varying educational levels (Diploma through Doctoral preparation). HMs are enlisted Navy military men and women with a minimum of a high school equivalent education and 12 weeks of Hospital Corps School. HMs provide care under the supervision of an RN and fall somewhere between a nursing assistant and an LVN in their training and practice.

Ward 1. Ward 1 was a 33-bed unit with 16-bed telemetry capability. While predominately providing care to medical patients, the unit was capable of caring for a variety of surgical and coronary patients. Ward 1 was also designed to prepare military physicians, nurses and corpsman for patient care in overseas, isolated duty, and operational settings in the care of ill adults. The unit contained private, semi-private and two negative pressure isolation rooms. Patients 18 years and older were admitted to this ward. The average length of stay was seven (7) days; the average patient age was 75 years old; and the average daily patient census was 26.

Ward 2. Ward 2 was a medical-surgical ward with the occasional mental health patient as overflow. There were nine services including general surgery, urology, medical oncology, gynecologic oncology, radiation oncology, gynecologic surgery, orthopedic surgery, internal medicine, neurosurgery, and neurology. It was an adult medical-surgical ward of active duty, retired and family members with ages ranging from 18 or greater with an average age of 27 years. The trend was toward more males than females and the length of stay was 5 days. The average census was 30 patients a day. The highest number of patients came from internal medicine. All inpatient chemotherapy admissions were admitted to this ward. Ward 2 also maintained the inpatient radiation safety rooms utilized in radioiodine therapy and external source radiation implants (brachytherapy). Ward 2 did not routinely care for patients with active or potential infectious processes due to the neutropenic patient population and the risk of cross contamination. On any given day there were one to four patients actively receiving chemotherapy, and one to three neutropenic patients in isolation.

Ward 3. Ward 3 was primarily a surgical ward with the occasional medicine patient as overflow. There were eight surgical services including general surgery, plastic surgery, bariatric surgery, orthopedic surgery, ear-nose-throat surgery (ENT), neurosurgery, ophthalmology and urology. It was an adult surgical ward of active duty, retired and family members with ages ranging from 18 or greater with an average age of 27 years. The trend was toward more males than females and the length of stay was 2.5 days. The average census was 30 patients a day. The highest number of patients came from general surgery and orthopedics. All trauma or post-trauma patients from Afghanistan and Iraq were admitted to this ward. Ward 3 historically had the highest infection rate among all of the wards due in part to the MRSA and Acinetobactor carried by the Operation Iraqi Freedom (OIF)/Operation Enduring Freedom (OEF) patients. On any given day, there were two to three patients in either contact or airborne isolation.

Total Patient Sample. The final patient sample consisted of 1,795 male admissions with a mean age of 51 years and 1,511 female admissions with a mean age of 54 years. The variable Age was not normally distributed for male or for female patients as assessed by Shapiro-Wilk's test (*p < .001);* both were slightly positively skewed (Table 1).

Table 1

Patient Sample Characteristics: Age by Gender

	Descriptive Statistics				Shapiro-Wilk [a]		
Gender	Mean (SD)	Skewness (SE)	Kurtosis (SE)	Range	Statistic	df	Sig.
Female	54.20 (0.54)	.08 (0.06)	-1.102 (0.26)	19-102	.96	1510	.000
Male	51.10 (0.88)	.19 (0.06)	-1.38 (0.12)	17-102	.91	1795	.000

Note. [a] Test for normality. *N = 3,305.*

A Chi-square test and a one-way ANOVA were conducted to compare the intervention Wards for statistically significant differences for Gender and Age respectively over the entire study period. There was no statistically significant difference for Gender by Ward, $\chi^2 (2) = 4.13$, *p = .10*; however, a statistically significant difference by Ward for mean Age was found, *F (2, 2585) = 124.70, p = .000*. Post hoc comparisons using the Games-Howell test (equal variances not assumed; unequal group sizes) indicated that the mean Age for the total sample and by Gender were statistically significantly different by Ward with patients on Ward One being younger than patients on Wards Two and Three. Table 2 provides the demographics for the entire study period by Ward and illustrates Age differences.

Total Nursing Staff Sample. Forty-eight members of the Medical-Surgical nursing staff participated (were consented) in the BTBI. Demographics were not collected about nursing staff participants as one method to ensure confidentiality. Of these 48 participants, 29 attended the BTBI Train-the-Trainer Course.

Outcome Variables of Interest

The Outcomes Variables of Interest for this project included Staff Knowledge, Patient Satisfaction with Nursing Care, Skin Integrity (Risk for Pressure Ulcers, Skin Condition), Sleep Quality, Pain Intensity, and Infection and Pressure Ulcer Rates. With the exception of Infection and Pressure Ulcer rates, descriptive statistics for each Outcomes of Interest including means differences in the Braden and Pain Scores maybe found in Table 3.

Findings related to each specific aim, objective, and question

Primary Aim. The primary aim of this Evidence-Based Practice (EBP) Project was to continue the development of the Evidence-Based Practice Protocol: "The Basic Bundle of Nursing Care" (BBBNC) using methodologies as described by Titler, Everette, and Adams (2007). This primary aim was accomplished by meeting the following objectives:

Objective 1a. Perform an effectiveness evaluation of the Back to Basics Intervention (BTBI) that incorporated the BBBNC elements and was conducted on three inpatient wards at a military medical center in southern California by identifying statistically and clinically significant differences in outcomes of interest before, during and after implementation of the intervention on each ward. Outcomes of interest evaluated included Staff Knowledge, Patient Satisfaction with Nursing Care, Skin Integrity (Risk for Pressure Ulcers, Skin Condition), Sleep Quality, Pain Intensity, and Infection and Pressure Ulcer Rates.

Table 2

Patient Sample Characteristics: Ward by Gender and Age

Ward	Females	%	Age [a]	Males	%	Age [b]	Total (100%)	Age [c]
1	384	42	46.54*	527	58	41.85"	911	44.01*
2	197	43	52.47*	262	57	58.59*	459	53.17*
3	565	46	61.61*	654	54	58.84	1219	58.17*
Total	1146	44	54.20[d]	1443	56	51.10[e]	2589[f]	53.62[f]

Note. [a] Mean Age in years by Female Gender by Ward uses Harmonic Mean sample size 169.69. [b] Mean Age in years by Male Gender by Ward uses Harmonic Mean sample size 215.02. [c] Mean Age in years by Ward uses Harmonic Mean sample size = 732.08. [d] Mean Age in years for all females. [e] Mean age in years for all males. [f] Mean age in years for total sample.
* p <0.001, two-tailed test.

Staff Knowledge. Staff Knowledge of the BBBNC was assessed using a paired pretest-post test design. A 35- item paper and pencil instrument was developed to evaluate knowledge of the elements of the BTBI and the BBBNC was administered to participants immediately before and again immediately after receiving the two-day Train-the-Trainer training.

The BTBI Staff Knowledge Assessment demonstrated content validity as determined by subject matter experts. Evidence in support of the BBBNC Staff Knowledge Assessment was evaluated using test-retest reliability (Pearson correlation). The Pearson correlation coefficient was chosen because the knowledge assessment included categorical, ordinal, and dichotomous items and research has shown it to be more stable with small samples than nonparametric methods.

The test-retest reliability (stability) for the BBBNC Staff Knowledge Assessment (n = 22) was found to be statistically significantly moderately correlated ($r = .47, .p = .02$). This value was not a surprise because the knowledge scores were found to have improved significantly from Time 1 to Time 2.

Table 3 provides the descriptive statistics for the Staff Knowledge Score. The BTBI was offered on two separate occasions; thus, there were two intervention groups for analyses. The intervention groups were not found to be statistically significantly different; therefore, they could

be combined for analysis. Intervention Groups that received the BTBI Train-the-Trainer Education are reported separately in Table 3.

Table 3

Descriptive Statistics: Outcomes of Interest

		Descriptive Statistics				Kolmogorov-Smirnov [a]		
Measure	*n*	Mean (SD)	Skewness (SE)	Kurtosis (SE)	Range	Statistic	df	Sig.
SKA [b]								
G1[c] Pre	14	78.07(4.01)	.13 (.60)	-.080 (1.15)	15	.19	14	.55
G1 Post	14	85.64(4.68)	-.17 (.60)	-.34 (1.15)	17	.17	14	.85
G2[d] Pre	8	73.75(4.60)	-.83 (.75)	.90 (1.48)	17	.19	8	.40
G2 Post	8	79.25(4.74)	-.61 (.75)	.29 (1.48)	15	.31	8	.30
PSNCQ	1572	6.52 (1.04)	-3.12 (.06)	11.35 (.12)	1-7	.41	1572	.000
Braden	6035	19.65(2.30)	-1.30 (.03)	.62 (.06)	4-23	.19.	6035	.000
BradenDiff	6035	-.65 (2.11)	-.14(.03)	1.47((.06)	-12+10	.17	6035	.000
Skin (Redness)	6786	.21 (1.64)	32.41 (.03)	1436.82 (.06)	0-77	.48	6786	.000
Sleep (HrsSleep)	4618	5.21 (2.22)	.06 (.04)	.07 (.08)	15	.11	4079	.000
Pain	5455	1.38 (1.69)	1.22 (.03)	.75 (.07)	0-10	.21	5455	.000
PainDiff	5851	-.31 (2.44)	-.25 (.03)	3.25 (.06)	-10+10	.31	5851	.000

Note. [a] Test for normality. [b] SK= Staff Knowledge Assessment. [c] G1 = Intervention group one (1). [d] G2 = Intervention group two.

     The variable Staff Knowledge was found to be approximately normally distributed. Because there were only complete pre and posttest data on 22 Train-the-Trainer participants, the Wilcoxon Matched-Pairs Signed Rank Test was used to evaluate change in participant knowledge from Time 1 (before receiving the two-day Train-the-Trainer BTBI education) to immediately after the intervention (Time 2). Analysis revealed a statistically significant increase in knowledge score from Time 1 to Time 2 (*Asymp sig <.001*) with a mean increase of 6.82%.

     Nursing Process. The Nursing Process Monitor questionnaire was administered approximately one month following the BTBI (one month after implementation of the BBBNC) as advised in Titler and Adams (2005). The purpose of this monitor was to determine nurse participants' understanding of the BBBNC and to assess their support for carrying out the protocol.
     This eight-item, four-level (1 =Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree) Likert-type survey evaluation was completed by 13 participants. The Median and Mode were 3 respectively indicating that participants completing the monitor felt they possessed the knowledge, preparation, and support necessary to carry out the BTBI with the BBBNC elements All participants that completed the Nursing Process Monitor Questionnaire agreed that they were better able to care for their Medical-Surgical patients using the protocol elements. None of the participants completing the survey scored any of the items less than a 3 (Disagree or Strongly Disagree).

     Patient Satisfaction with Nursing Care. Patient satisfaction with nursing care was evaluated using the Patient Satisfaction with Nursing Care Questionnaire (PSNCQ) (Jacox, Bausell, Barker, & Marenholz, 1997). The PSNCQ is a 17-item Likert-type instrument that measures satisfaction with nursing caring, technical skills, and education. The reliability and validity of the instrument has been demonstrated in previous studies using factor analysis and bivariate correlation analysis; alpha coefficients have been published in previous methodological studies (N = 50, 100, 200, 1,453) and range between .89 and .92. In this project the alpha was determined to be .97 (N = 1,572).
     The PSNCQ was provided to patients on the three intervention wards at the time of discharge with discharge instructions. The patients were asked to fill the PSNCQ and deposit it in the designated receptacle (purple survey box with signage, "patient satisfaction with nursing care survey" in order to differentiate it from the medical center's patient satisfaction survey).
     Table 3 provides the descriptive statistics for the PSNCQ. The PSNCQ was found to be negatively skewed. Although, ANOVA tends to be robust especially with large samples (Plichta & Kelvin, 2013), this skewness was not a modest departure from normality; therefore, the Two-Way ANOVA with and without bootstrapping was utilized in order to construct a "null distribution" without the normality assumption (Bond, 2015)
     Two-Way Analysis of Variance (ANOVA) tests were performed to answer the following different, but related questions:

1. Does participation in the BTBI using the elements described in the BBBNC result in statistically significant change in Patient Satisfaction with Nursing Care over Time as measured by the PSNCQ?
2. Is there a difference in mean change by Month (Time) and by Ward in the PSNCQ?
3. Is there an interaction effect between Month (Time) and Ward in the PSNCQ?

A Two-Way ANOVA did not reveal a statistically significant change in Patient Satisfaction with Nursing Care from one month pre-intervention (Time 1) to Month 6 of the intervention (Time 7) as measured by the PSNCQ on three Medical-Surgical Wards, *F(2)(6) = 1.22, p=.23*. The Two-Way ANOVA with multiple comparisons was repeated with bootstrapping (1000 samples, 95% CI). Statistically significant differences were found for Month and Ward. Significant difference for Month occurred from Month 1 (Time 2) of the intervention to Month 3 (Time 4), *Mean Difference +0.20 (SE = .09), 95% CI = 0.03, 0.38* and Month 6 (Time 7), *Mean Difference = +0.21 (SE = .09), 95% CI=0.04, 0.40.* The statistically significant difference for Ward occurred between Wards 1 and 2, *Mean Difference = +0.26 (SE = .09), 95% CI = 0.08, 0.42.*

Skin Integrity. Skin Integrity was evaluated using measures of risk and current skin condition, specifically the Braden Scale and the Skin Condition Data Form (SCDF) as modified for this project.

The Braden Scale is composed of six subscales to include sensory perception, skin moisture, activity, mobility, nutrition, and friction/shear (Bergstrom & Braden, 2002; Braden & Makelbust, 2005; Pancorbo-Hildalgo, Garcia-Fernandez, Lopez-Medina, & Alvarez-Nieto, 2006). All subscales are rated from 1 to 4 except shear, which is rated 1 to 3. Potential scores range from 4 to 23; lower scores indicate higher risk. The Braden Scale has demonstrated a high degree of interrater reliability (*r* = 0.99, percent agreement = 88*%).* The validity of the Braden Scale to predict risk of developing a pressure ulcer by examining six criteria has demonstrated sensitivities that range from 70 % to 100 % and specificities ranging from 64 % to 90 %.

The Braden Scale was completed by the nursing staff within 24 hours of patient admission and upon discharge. The difference in scale score from admission to discharge was used to compute the Braden Scale Mean Difference Score. Table 3 provides the descriptive statistics for the Braden Scale. A Two-Way Analysis of Variance (ANOVA) test was performed to answer the following different, but related questions:

1. Does participation in the BTBI using the elements described in the BBBNC protocol result in a statistically significant change over Time in the Braden Score?

2. Is there a difference in mean change by Month (Time) by Ward in the Braden Mean?

3. Is there an interaction effect between Month (Time) and Ward in the Braden Mean?

The Two-Way Analysis of Variance (ANOVA) revealed a statistically significant change in Braden Scale Scores Mean Difference from one month pre-intervention (Time 1) to Month 6 of the intervention (Time 7) on three Medical-Surgical Wards, *F(2)(6) = 3.09, p=.002* with the greatest overall change occurring in month 5 of the intervention (Time 6) (*M=-.56, SD=2.24)* . There was a significant main effect for Time, *F(2)(6) =2.65, p =.014*, and for Ward, *F(2)(6) = 4.70, p =.009;* however, no interaction effect for Time by Ward on risk for pressure ulcer development was apparent, *F (2)(6) = 1.01, p=.44*. The greatest difference in risk for pressure ulcer development as measured by the Braden Scale Mean Difference Score from pre-intervention occurred on Ward 3 (*M=-.60, SD=2.13*).

The Skin Condition Data Form (SCDF) has been used to assess dry skin in the elderly hospitalized patient (France & Kinney, 1986). The SCDF was modified by Hoyle in 1990 by

narrowing the assessment categories to four defining characteristics of dry skin (i.e., redness, flaking, scaling, and cracking). The SCDF was modified again for this project to include additional signs and symptoms of incontinence dermatitis (rash/blistering) (Bliss, et al, 2006; Fader, et al, 2003). The modified SCDF is a summed score with a range of 0 – 140; the higher the score, the poorer the skin condition and the more pronounced the skin integrity problem.

Percent agreement between raters on history, current skin practices, and observed dryness have been 87.3 %, 62.5 %, and 68 % respectively with SCDF (France & Kinney, 1986; Bliss, et al, 2006; Fader, et al, 2003). The instrument has content validity based on literature review and subject matter expert input.

The SCDF (France & Kinney, 1986; Hoyle, 1990), modified for use in this project with the addition of the Rash Blister assessment, demonstrated reliability with a Cronbach's Alpha of .98. For this project, exploratory factor analysis, using principal components factoring and an Eigen value greater than one (1), revealed that 98 % of the variance in the scale was explained by component 1 "Redness". Small, but statistically significant correlations were found between all scale items ($p <.05$). A Two-Way Analyses of Variance (ANOVA) test was performed to answer the following different, but related questions:

1. Does participation in the BTBI using the elements described in the BBBNC protocol result in a statistically significant change over time in Skin Condition?
2. Is there a difference in mean change by Month (Time) by Ward in Skin Condition?
3. Is there an interaction effect between Month (Time) and Ward in Skin Condition?

The analysis revealed a statistically significant change in Skin Condition measured monthly for seven months by the Redness Subscale of the SCDF on three Medical-Surgical Wards, *$F_{(2)}(6) = 6.78$, $p=.000$.* There was a significant main effect for Time, *$F_{(2)}(6) = 5.83$, $p =.000$*, and for Ward, *$F_{(2)}(6) = 20.98$, $p =.000$;* and a statistically significant interaction effect for Time by Ward on Skin Condition (Redness) was found, *$F_{(2)}(6) = 3.193$, $p=.000$*.

The greatest difference in Redness as measured by the SCDF Redness Subscale from pre-intervention (Time 1) occurred in Month 1 of the intervention (Time 2). The mean Redness score was significantly higher on Ward 3 than on Wards 1 and 2 at pre-intervention measurement, (*M = .92, SE = .08), 95% CI [.76, .11*]; Ward 3 also had the greatest reduction in Redness score with the greatest significant difference occurring in Month 4 of the intervention (Time 5) (*M = .15, SE = .07), 95% CI [.01, .29]*.

Pain Intensity. The Numerical Rating Scale (NRS) (NCCN, 2005) was used to evaluate level of perceived pain intensity on all adult medical surgical patients and was recorded in the electronic record as part of vital signs.

In a systematic review of the literature, Williams and Hoggart (2005) (N = 50 studies), found the NRS to be valid, reliable, and appropriate for use in clinical practice. The NRS has demonstrated strong correlation with the Visual Analog [pain] scale (VAS) (*r = .94, CI = .93-.95*); the VAS has demonstrated test-retest reliability of .97 to .99 (Bijur, Latimur, & Gallagher, 2003). The failure rate for ability to report perception of pain intensity with the NRS is low (2 %).

A Two -Way ANOVA test was performed to answer the following different, but related questions:

1. Does participation in the BTBI using the elements described in the BBBNC result in a statistically significant change over Time in reported Pain Intensity?
2. Is there a difference in mean change by Month (Time) by Ward in Pain Intensity?
3. Is there an interaction effect between Month (Time) and Ward with regard to reported Pain Intensity?

A Two-Way Analysis of Variance (ANOVA) did not reveal a statistically significant change in the Mean Difference of Reported Pain Intensity one month pre-intervention (Time 1) to Month 6 of the intervention (Time 7) as measured by the NRS on three Medical-Surgical Wards, $F(2)(6) = 1.38, p=.20$. Reported Mean Difference of Pain Intensity did increase across all wards from a Mean Difference of -0.48 pre-intervention (Time 1) to a Mean Difference of Reported Pain Intensity of -0.32 in the last month of the intervention (Time 7), but this difference of -0.16 did not reach statistical significance.

Sleep Quality. The Pittsburg Sleep Quality Index (PSQI) (Weinstein, Dement, Redington, et al., 1983) was used to assess sleep quality. The original PSQI is a 19-item instrument; for this project a brief nine-item instrument was used. As part of morning care, the brief PSQI was asked of all patients by their nursing care provider.

The original PSQI has an overall reliability coefficient (Cronbach's alpha) of .77 to .83. The correlation coefficient for test-retest reliability has been documented to be .85 The validity of the PSQI has been supported by its ability to discriminate patients and controls and by concurrent polysomnographic findings.

In this project, the nine item-PSQI was found to have a Cronbach's alpha of .57. The reliability analysis score of .57 was not considered sufficiently reliable, therefore the decision was made by the EBP team in consultation with mentors and subject matter experts to use the answer to the PSQI question, "Approximately how many hours did you sleep?" as a measure of sleep quality.

Table 3 provides the descriptive statistics for "Hours of Sleep". A Two-Way ANOVA test was performed in order to answer the following different, but related questions:

1. Does participation in the BTBI, using the elements described in the BBBNC, result in a statistically significant change over Time in the Sleep Quality as measured by Hours of Sleep?
2. Is there a difference in mean change by Month (Time) by Ward in Hours of Sleep?
3. Is there an interaction effect between Month (Time) and Ward in Hours of Sleep?

The Two-Way Analysis of Variance (ANOVA) revealed a statistically significant change in Hours of Sleep over seven months, from one month pre-intervention (Time 1) to Month 6 of the intervention (Time 7) on three Medical-Surgical Wards, $F(2)(6) = 2.04, p=.004$. There was a significant main effect for Time, $F(2)(6) =3.92, p =.001$; however, there was not a significant main effect for Ward, $F(2)(6) = 1.46, p =.21$; and, no interaction effect for Time by Ward on Hours of Sleep was apparent, $F(2)(6) = 1.10, p=.35$

The greatest increase in number of mean hours slept was from one month pre-intervention (Time 1) ($M=5.25, SD=2.22$) to Month 3 of the intervention (Time 4) ($M=5.38, SD=2.20$). The greatest change was a decrease in Hours of Sleep occurring in Month 6 of the intervention (Time 7) to a mean of 4.70 hours of sleep ($SD=1.97$). The trend towards a

statistically significant decrease in hours slept began in Month 4 (Time 5) of the intervention (*M=5.22, SD=2.34*).

Table 4
Two-Way ANOVA Summary: Main and Interaction Effects

	R^2	df	F	n	p
Patient Satisfaction with Nursing Care[a]					
Model	.01	20	1.21	1572	.23
Month		6	1.02		.41
Ward		2			.02
Month*Ward		12	0.41		.96
Risk for pressure ulcer (Braden Scale)					
Model	.11	20	1.84	3421	1.84
Month		6	2.65		.01
Ward		2	4.70		.01
Month*Ward		12	1.01		.44
Skin Condition (Redness)					
Model	.17	20	6.78	6786	.000
Month		6	5.83		.000
Ward		2	20.98		.000
Month*Ward		12	3.19		.000
Pain Intensity (NRS)					
Model	.01	20	1.41	3116	.11
Month		6	1.10		.36
Ward		2	2.02		.13
Month*Ward		12	1.43		.15
Sleep Quality (Hours of Sleep)					
Model	.10	20	2.04	4079	.004
Month		6	3.92		.001
Ward		2	1.55		.21
Month*Ward		12	1.10		.35

Note. Bootstrapping (1000 samples) of PSNCQ demonstrated significant difference between Months 1 and 3 and Months 1 and 6 of the intervention and between Wards 1 and 2 at the 95% CI.

Objective 1b. Perform an effectiveness evaluation of the BTBI on three inpatient wards at a military medical center in southern California by identifying the BBBNC elements that individually and together best predict patient outcomes. In order to control for confounding, demographic variables including "ward admitted to" were included in the prediction model.

Analysis began with a description of each documentation form (AM and PM). Normality was assessed using visual and statistical techniques. Psychometric properties for the AM and PM

Care Intervention Documentation Forms were also evaluated. The descriptive statistics and psychometric properties for the BBBNC Subscales (AM and PM Care Elements) are described below and are summarized in Tables 5 and 6.

Descriptive Statistics and Psychometric Properties. The individual items that made up the AM Care Intervention Documentation Form and the PM Care Intervention Documentation Form were evaluated in order to provide evidence in support of their reliability and validity as documentation methods using bivariate correlation analyses, Exploratory Factor Analysis (Principal Component), and Kuder-Richardson-20 Reliability Analysis.

Using the methodology as described by Plichta and Kelvin (2013) for bivariate correlation analyses, associations were considered weak to nonexistent if the value of Pearson's and/or Spearman's correlation coefficients (denoted by *r*) were $\pm$ .10, moderate if $\pm$ .30, and substantial if $\pm$.50 or greater. Correlation coefficients of .80 or greater were considered indications of multicollinearity.

Bivariate correlation analyses revealed that all AM Care items on the 36-item AM Care Intervention Documentation Form were correlated at least .30 with at least one other item, suggesting reasonable factorability; no multicollinearity was found. Bivariate correlation analyses also revealed that all PM Care items on the 33-item PM Care Intervention Documentation Form were correlated at least .30 with at least one other item, suggesting reasonable factorability no multicollinearity was found .

Exploratory Factor Analysis (Principal components analysis (PCA) was used to identify and compute composite (groups) scores for the factors underlying AM and PM Care respectively (e.g., bathing, oral care, bath care). The 36-items that make up the AM Care Intervention Documentation Form were analyzed using PCA. Initial Eigen values indicated that the first four factors explained 16%, 10%, 7%, and 6% of the variance respectively. Factors five, six, and seven each explained 4% of the variance, and factors eight, nine, ten, and 11 each explained 3% of the variance; factor 12 explained an additional 2.69 % of the variance; therefore, the 12-factor solution was retained. All items met the minimum criteria of having a primary factor loading of .30 or above. The 12-factor solution explained 65% of the variance in AM Care Intervention Documentation providing initial evidence in support of its validity for documentation of AM care.

The 33-items that make up the PM Care Intervention Documentation Form were analyzed using PCA. Initial Eigen values indicated that the first two factors explained 15% and 10% respectively, factors three through five each explained 6% of the variance respectively. Factor six explained 5% of the variance, and factors seven through nine each explained 4 % of the variance with factors ten, and 11 each explaining 3% of the variance. The 11-factor solution was retained. All items met the minimum criteria of having a primary factor loading of .30 or above. The 11-factor solution explained 65% of the variance in PM Care Intervention Documentation, providing initial evidence in support of its validity for documentation of PM care.

The reliability of the 36-item AM Care Intervention Documentation Form was evaluated using Kuder-Richardson-20 (KR-20), a special case of Cronbach's alpha for dichotomous (nominal level) items. The KR-20 was .83 with no items deleted, suggesting very good reliability for a new instrument. When items were combined into 12 Subscales, this score decreased to .78, still very good for a new instrument. The reliability of the 33-item PM Care Intervention Documentation Form was also evaluated using the KR-20. The KR-20 for the 33-Item PM Care Intervention Documentation Form was .80 with no items deleted, also suggesting very good reliability for a new instrument; however, the total alpha decreased to .62 when the individual elements were combined to form a subscale.

Individual elements that make up each BBBNC Subscale may be found on the AM and PM Care Intervention Documentation Forms. The documentation forms are located in the Appendices.

Change in performance of AM and PM Care Elements. The first question that was answered in this analysis was: Was there a change in rate of performance for each of the BBBNC Elements (Predictor variables) from pre (1 month pre-intervention) to post (measured monthly x 6 months) for each of the Outcomes of Interests (Criterion Variables) that demonstrated statistically significant change over the course of the study?

One-Way Analysis of Variance (ANOVA) tests and post hoc comparisons of BBBNC (AM and PM Care) Elements (mean scale scores) revealed statistically significant changes from one month pre-intervention (Time 1) to month six of the intervention (Time 7) for the AM Care elements, Oral Care, $F(6, 14) = 9.44, p = .000$, Hair Care, $F(6, 14) = 7.26, p = .001$ and Linen Care, $F(6,14) = 4.34, p = .01$.

Table 5

Psychometric Properties of the 36-Item AM Care Documentation Tool

Subscale	No. of Items in Subscale	M (SD)	Alpha
AM Infection Control	2	1.94 (.30)	.74
AM Pain Assessment[a]	1	.96 (.19)	.75
AM Bath	7	.72 (.77)	.71
AM Shave	2	.08 (.28)	.75
AM Oral Care	4	.81 (.84)	.70
AM ROM	2	.62 (.63)	.72
AM Hair Care	2	.46 (.69)	.71
AM Skin Care	3	.43 (.76)	.72
AM Perineal Care	4	.57 (1.01)	.71
AM Foot Care	4	.35 (.72)	.70
AM Linen Care	3	2.40 (1.13)	.75
AM Environment	2	1.95 (.28)	.74
AM Care Scale	**12 Subscales/36 Items**	**13.70 (5.04)**	**.78[b] -.83[c]**

Note. N = 8965. [a]Single dichotomous item (Yes/No). [b]Scale reliability when using Subscales. [c]PM Scale reliability using individual items in analysis.

The greatest significant change for the documented performance of AM Oral Care (teeth brushed, flossed, lips moistened, dentures cleaned if applicable) occurred between Month 1 (Time 2) and Month 6 (Time 7) of the intervention with a mean difference of *+0.29 (SE=0.02), 95 % CI =0.17, 0.42.* The greatest significant change for the documented performance of AM Hair Care (hair brushed, hair washed) occurred between Month 1 of the intervention (Time 2) and Month 5 (Time 6) with a mean difference of *+0.12 (SE = 0.02), 95% CI =0.02, 0.2.* The greatest significant difference for the performance of Linen Care (gown change, linen change, and soiled linen place in hamper) occurred between Month 4 (Time 5) and Month 6 (Time 7) of the intervention with a mean difference of *+0.13 (SE=0.02), 95% CI = 0.01,0.25.*

Given the efforts to replace basin baths with bag baths and flushable bathing cloths at the bedside, it was concerning that basin baths were still in use 25% of the time. Bag baths were used 24% of the time with patients using the tub or shower 27% of the time.

One-Way ANOVA did not reveal a statistically significant change in mean scores for any of the PM Care Elements (mean scale scores) ($p > .05$) from Time 1 to Time 7. Surprisingly, interventions to decrease noise on the intervention Wards did not change significantly for any of the intervention months. When the frequency of performance of individual elements of the PM Noise Reduction Subscales was explored, offering earplugs only occurred 50% of the time over the course of the intervention.

Prediction of Outcomes. The second question that was answered in this analysis was, "What basic elements of nursing care best predict (1) the patient outcomes individually and (2) in combination?"

Bivariate correlations were performed using Month, Unit, AM and PM Care Element Mean Scale Scores and Mean Scores for the Outcomes of Interest that had demonstrated statistically significant changes over the course of the intervention, specifically Patient Satisfaction with Nursing Care (PSNCQ), Risk for Pressure Ulcer (Braden Scale), Skin Condition (SCDF Redness), and Sleep Quality (Hours of Sleep). Those scales that demonstrated statistically significant correlations were then included in the stepwise multiple regression analysis in order to determine which combination of AM and PM Care Elements would best predict each Outcome of Interest. The Bivariate Correlation Analysis may be found in Table 7 and the summary table for the Stepwise Regression Analysis may be found in Table 8.

Table 6
Psychometric Properties of the 33-Item PM Care Documentation Tool

Subscale	No. of Items in Subscale	*M (SD)*	Alpha
PM Noise	3	2.34 (.70)	.34
PM Infection Control	2	.97 (.30)	.84
PM Pain Assessment[a]	1	.96 (.19)	.75
PM Bath	2	.41 (.75)	.84
PM Oral Care	4	.81 (.84)	.57
PM Skin Care	4	.29 (.67)	.72
PM Perineal Care	4	.32 (.68)	.76
PM Linen Care	4	1.91 (1.6)	.84
PM Elimination	2	.80 (.74)	.27
PM Environment	5	1.95 (.28)	.64
PM Safety	2	.99 (.00)	.90
PM Care Scale	**11 Subscales/33 Items**	**15.04(3.53)**	**.62[b] -.80[c]**

Note. N = 9066. [a]Single dichotomous item (Yes/No). [b]Scale reliability when using Subscales. [c]PM Scale reliability using individual items in analysis.

Patient Satisfaction with Nursing Care (PSNCQ). A stepwise multiple regression analysis was conducted to evaluate whether PM Bath, Oral, Perineal, Skin, and Linen Care were necessary to predict Patient Satisfaction with Nursing Care as measured by the PSNCQ. At step one of the analysis PM Oral Care entered into the regression equation and was significantly related to Patient Satisfaction with Nursing Care, $F (1)(19) = 12.20, p=.002$. The multiple correlation coefficient (R) was .63 and the coefficient of determination (R^2) was .39 indicating that 39 % of the variance in Patient Satisfaction with Nursing Care could be accounted for by PM Oral Care. The Subscale elements PM Bath, Perineal, Skin, and Linen Care did not enter into

the equation at step two of the analysis (*p > .05*). The regression equation for predicting Patient Satisfaction with Nursing Care in this project is represented by the equation:

Predicted Patient Satisfaction with Nursing Care = .60(PM Oral Care) + 6.47 (constant)

Risk for Pressure Ulcer (Braden Scale). A stepwise multiple regression analysis was conducted to evaluate whether PM Bath, Perineal Care, Environment, Infection Control, and Linen Care were necessary to predict Risk of Pressure Ulcer (Mean Difference) as measured by the Braden Scale. At step one of the analysis PM Infection Control entered into the regression equation and was significantly related to Risk for Pressure Ulcer, *F (1)(19) = 7.26, p=.014.* The multiple correlation coefficient (*R*) was .53 and the coefficient of determination (R^2) was .28, indicating that 28 % of the variance in Risk for Pressure Ulcer could be accounted for by PM Infection Control. PM Bath, Perineal Care, Environment, and Linen Care did not enter into the equation at step two of the analysis (*p > .05*). The regression equation for predicting Risk for Pressure Ulcer in this project is represented by the equation:

Risk for Pressure Ulcer (Mean Difference) = 2.92 (PM Infection Control) - 6.40 (constant)

Skin Condition (SCDF) (Redness). A stepwise multiple regression analysis was conducted to evaluate whether Month, AM Linen Change, Oral Care, Foot Care, and PM Noise Reduction Measures were necessary to predict Skin Condition (Redness) as measured by the SCDF Redness Scale. At step 1 of the analysis Month (of intervention) entered into the regression equation and was significantly related to Skin Condition (Redness), *F (1)(19) = 8.39, p=.009.* The multiple correlation coefficient (*R*) was .55 and the coefficient of determination (R^2) was .31, indicating that 31 % of the variance in Redness could be accounted for by Month (Time). At step 2 AM Linen Care entered into the equation and together with Month was significantly related to Skin Condition (Redness), *F(2)(18) = 9.51, p = .002.* The multiple correlation coefficient (*R*) was .72 and the coefficient of determination (R^2) was .51, indicating that 51 % of the variance in Redness could be accounted for by Month (Time) and AM Linen Care. The AM Care Subscales Oral Care, Foot Care, and the PM Subscale Noise Reduction did not enter into the equation at step three of the analysis (*p > .05*). The regression equation for predicting Skin Condition (Redness) in this project is represented by the equation:

Skin Condition (SCDF) (Redness) = -.25(Month) + -6.60 (Linen Change) + 17.50 (constant)

Sleep Quality (Hours of Sleep). A stepwise multiple regression analysis was conducted to evaluate whether Month, Unit, AM Skin, Oral, Foot, Hair Care, and ROM were necessary to predict Sleep Quality as measured by Hours of Sleep. At step one of the analysis AM Oral Care entered into the regression equation and was significantly related to Hours of Sleep, *F (1)(19) = 24.76, p=.000.* The multiple correlation coefficient (*R*) was .75 and the coefficient of determination (R^2) was .57, indicating that 57 % of the variance in Hours of Sleep could be accounted for by AM Oral Care. At step two, AM ROM entered into the equation and together with Oral Care was significantly related to Hours of Sleep, *F(2)(20) = 16.92, p = .000.* The multiple correlation coefficient (*R*) was .81 and the coefficient of determination (R^2) was .65 indicating that 65 % of the variance in Hours of Sleep could be accounted for by AM Oral Care and ROM. The variables Month, Unit, AM Skin, Foot, and Hair Care did not enter into the

equation at step three of the analysis (*p > .05*). The regression equation for predicting Sleep Quality (Hours of Sleep) in this project is represented by the equation below:

$$\text{Hours of Sleep} = 1.22\,(\text{AM Oral Care}) + .94(\text{AM ROM}) + 3.64\,(\text{constant})$$

Table 7
Correlations: Month, Mean AM and PM Care Scale Scores and Outcomes of Interest[a]

	Pearson's Correlation Coefficients			
	PSNCQ	Braden (Risk)[a]	SCDF (Redness)	PSQI (Hrs of Sleep)
Month[b]	.07	.07	-.55**	-.53*
AM Skin	.16	-.48*	.23	.58**
AM Oral	.19	-.02	.54**	.75**
AM ROM	-.00	-.46*	.28	.68**
AM Hair	.25	-.13	.36	.50*
AM Foot	.13	-.20	.47**	.46*
AM Linen	-.13	.50*	-.53*	-.12
PM Noise	.26	.31	-.52**	-.38
PM Bath	.59**	.24	.28	.02
PM Oral	.63**	.26	.17	.09
PM Skin	.53*	.35	.08	.05
PM Peri	.49*	-.34	.29	.08
PM Linen	.46*	.50*	.50*	.06
PM Infection	.43	.53*	.53*	-.35

Note: N = 21 Means (3 Wards x 7 Months). *p < .05,* two-tailed, ** *p <.01*, two-tailed. [a] Mean Difference. [a]Only statistically significant correlations are presented. [b]Month and Ward were evaluated; Month included because statistically significant relationship identified.

Objective 2. Perform a feasibility evaluation of the BBBNC by determining the degree to which protocol elements were put into practice with fidelity by trained staff according to the written project plan.

Process Evaluation and the Process Implementation Index. The Feasibility Evaluation assessed whether or not elements of the BTBI were performed with fidelity as written in the project plan to include the two-day Train-the-Trainer educational intervention and the individual

elements of basic nursing care that together define the BBBNC protocol. The Process Evaluation and associated Process Implementation Index (PII) are provided in Table 9. A PII of .80 was desired; the PII for the BTBI and BBBNC was .76.

Table 8
Stepwise Regression Analysis Summary

	B	*Std. Error*	*β*	*T*	*Sig. T*
Patient Satisfaction with Nursing Care					
Predictor(s)					
PM Oral Care	.60	.17	.63	3.49	.002
Model 1 *F (1,19) = 12.20, p = .002, R = .63, R^2 = .39*					
Risk for Pressure Ulcer (Braden Scale)					
Predictor(s)					
PM Infection Control Measures	2.92	1.08	.53	2.69	.007
Model 1 *F(1,19) = 7.26, p = .014, R = .53, R^2 = .28*					
Skin Condition (Redness)					
Predictor(s)					
Month of intervention (Time)	-.29	.10	-.55	-2.90	.009
Model 1 *F(1,19) = 8.39, p = .009, R = .55, R^2 = .31*					
Month of intervention (Time)	-.25	.09	-.49	-2.96	.008
AM Linen Care	-6.60	2.38	-.46	-2.77	.013
Model 2 *F(1,19) = 9.51, p = .002, R=.72, R^2 = .51*					
Sleep Quality (Hours of Sleep)					
Predictor(s)					
AM Oral Care	1.71	.34	.75	4.90	.000
Model 1 *F(1,19) = 24.76, p = .000, R = .75, R^2 =.57*					
AM Oral Care	1.22	.39	.54	3.10	.006
AM ROM	.94	.44	.37	2.12	.048
Model 2 *F(1,19) = 16.92, p = .000, R = .81, R^2=.65*					

Note. N = 21 Means (3 Wards x 7 Months).

***Objective 3a*. Perform a cost analysis of the BBBNC by comparing the cost of delivery of the BBBNC to the historical cost of care delivery on each intervention ward.**

Information used to evaluate the cost of this intervention was obtained from the historical data and the PII. Cost analysis only considered direct costs to deliver care. Although, actual costs are not reported here, the cost of the delivery of BBBNC care did not increase on any of the intervention wards. Each Ward's budget was fixed and no items cold be purchased over and above the fixed budget. Items purchased for the intervention were evidence-based but sometime the team's second choice had to be utilized because a particular preferred care item might not be available through the Regional Hospital [purchasing] Alliance (REHA).

***Objective 3b*. Perform a cost analysis of the BBBNC by comparing the number of infections and pressure ulcers averted pre and post initiation of the BTBI and BBBNC.**

Hospital Acquired Pressure Ulcers (HAPUs). Cost analysis relied on secondary analysis of data on "newly acquired" Pressure Ulcers known as Hospital Acquired Pressure Ulcers (HAPU). No HAPUs were reported during the seven-month intervention; and, no HAPUs were reported for the same seven-month period for the previous year. Patients that were admitted with obvious pressure ulcers were not included in the numbers; therefore, there were pressure ulcers that were identified and cared for, but they were not HAPUs.

Table 9
Feasibility Evaluation

	Procedures	A^a	B^b	$(B/A=C)^c$ %	D^d %	$(C/D=E)^e$
1.	Collect baseline data: 6 months x 3 wards	3	1	33	100	.33
2.	Site assessment by subject matter experts	1	1	100	100	1.00
3.	BTBI Pretest completed by key personnel	32	32	100	99	1.01
4.	Train-the-Trainer Educational Intervention completed by key personnel	32	29	91	100	.91
5.	BTBI Post-test completed	29	23	79	100	.79
6.	Collect one month historical data	3	3	100	100	1.0
7.	BTBI Pretest completed by all participating staff x 3 wards	90	30	33	95	.35
8.	BTBI Post-test completed by all participating staff x 3 wards	30	12	40	95	.42
9.	Collect data x 6 months on 3 wards (333 admissions/month/outcome/ward	11988	11333	95	95	1.0
	Total BTB Intervention					.76

Note. The PII was computed by dividing the portion reached by each procedure by the project standard: C/D = E. All indices were added and that number was divided by the total number of procedures. [a]Eligible. [b]Exposed. [c]Completion Rate. [d]Performance Standard. [e]Procedure Implementation Index.

Reportable Healthcare Associated Infections (HAIs).   Healthcare Associated Infections (HAIs) routinely monitored and reported included Methicillin-Resistant Staphylococcus aureus (MRSA), Vancomycin-Resistant Enterocci (VRE), Aspergillus fumigatus, and Clostridium difficile (C. diff). Additionally, catheter-related blood stream infections (CR-BSI) and ventilator-associated pneumonias (VAP) were followed. Surveillance reports were obtained by the PD from the Nursing Service Representative to the Infection Control Committee.

The total reported number of months of reporting was small (N = 14); therefore, the non-parametric test, Mann-Whitney U was used to determine whether or not there was a difference between the same months in the previous year and those of the intervention year with regard to the number of reported HAIs.

The number of reportable HAIs decreased from the same seven month period in the prior year (20 infections) to the seven month period of the BTBI and BBBNC (11 infections); however, this change did not reach statistical significance ($Z = -1.51; p > .05$). Although the change did not reach statistical significance, it was clinically significant.

Relationship of current findings to previous findings

Objective 1a. Perform an Effectiveness Evaluation of the Back to Basics Intervention

Staff Knowledge. After participation in the BTBI Train-the-Trainer Course, participant knowledge increased significantly *(Sig. <.05)*. Additionally, responses to The Nursing Process Monitor revealed that the nursing staff felt knowledgeable, supported, and prepared to provide the BBBNC Elements to their Medical-Surgical Patients. The course materials and DVD are still in use at the medical center.

Despite the increase in knowledge about the BBBNC, there was no statistically significant improvement in the provision of any of the PM Care Subscale elements. These findings led to the conclusion that it was not lack of knowledge that was keeping staff from performing care elements; something else was preventing the implementation of the BBBNC.

Melynk, Gallaggher-Ford, Fineout-Overholt, and Kaplan in their 2012 report on the state of evidence based practice in the U.S., described other barriers to the successful implementation of EBP; one of these barriers was resistance to the implementation of EBP interventions from work colleagues including physicians, fellow nurses, nurse leaders, and nurse managers. Some measurement or consideration of this resistance to implementation by "others" should be included in future research studies and EBP evaluations.

The evaluation of EBP projects in general, and specifically around the performance of basic elements of nursing care is complex and that was evident in this project. This complexity, in both the provision and documentation of care, has been described in the literature. (Englebright, Aldrich, & Taylor, 2014; Kitson, Athlin, & Conroy, 2014).

In their efforts to define "basic nursing care" for adult patients, Englebright , Aldrich, and Taylor (2014) explained the historical (and current) need for nurses to address regulatory and reimbursement requirements as they document care. In their literature synthesis about the fundamental concept of basic nursing care, Kitson , Athlin, and Conroy (2014) described the tension between what amounts to caring for the machines and providing fundamental physical and psychological care for patients. Fundamental basic care is described conceptually and some individual elements of basic care are listed.

What was clear from the review of the literature for this discussion was that while nurse leaders and researchers understood the importance of the provision and documentation of basic nursing care, it was very difficult for nursing staff to provide and document in a systematic fashion. As of 2013, no research reports about basic nursing care, in areas other than the intensive care unit, and that provide adequate detail have been published; there has also been a lack of published research that describes the contributions of basic nursing care to patient outcomes (Van Achterberg, 2013). This project has begun to fill that gap.

Patient Satisfaction with Nursing Care. The alpha for the PSNCQ in this project was quite high (.97) and may indicate that some items on the questionnaire were/are redundant and are measuring the same thing (Tavakol & Dennick, 2011). High alphas (>.90) have been

previously reported in the reliability analyses of questionnaires measuring patient satisfaction (Mincu &Tascu, 2014). Perhaps this is because patient satisfaction is best described as a unidimensional construct, or as a construct, that has one predominant dimension. Regardless, examination of this phenomenon is recommended in future research and EBP projects.

Reported Patient Satisfaction with Nursing Care was high prior to and throughout the BTBI (*M= 6.52, SD=1.04*). Statistically, because of the pronounced negative skew, the increase in satisfaction was not appreciated; however with exploratory bootstrapping (1000 samples), there was an apparent significant increase in Patient Satisfaction with Nursing Care. Evaluating the Two-Way ANOVA Model R^2, it became evident that something other than Month (Time) or Ward was responsible for the high patient satisfaction because only slightly more than 1 % of the variability in Patient Satisfaction with Nursing Care was accounted for by these two variables. Stepwise regression analysis revealed that PM Oral Care was significantly predictive of Patient Satisfaction with Nursing Care and accounted for 39% of the variance in PSNCQ mean scores when entered into the regression equation with BBBNC protocol elements.

The initial impetus for this project was a decrease in patient satisfaction with "hygiene needs met". This project provides evidence in support of the continuing need for essential basic nursing care and specifically for PM Oral Care with regard to Patient Satisfaction. The first four of the 17 questions on the PSNCQ are questions about the patient's overall satisfaction with (1) Hospital stay, (2) Food provided, (3) Medical care received, and (4) Nursing care. In regression analysis of the 17-Items contribution to the overall PSNCQ Score, 70 % of the variance in that score was explained by the Overall Satisfaction with Nursing Care Received, *F(1, 1356) = 2874.06, p = .000*).

No research studies to date speak specifically to the effect of Oral Care on Patient Satisfaction with Nursing Care. Indeed, there is a paucity of well-done interventional research that answers questions about basic nursing care interventions and Patient Satisfaction with Nursing Care in general and more specifically in patient care areas outside of the intensive care unit (ICU) (Warf, 2012). In one systematic review of 16 research studies, the author found that patient satisfaction with nursing care studies suffered from small convenience samples, non-experimental designs and poorly detailed interventions.

Oral care is a public health priority (Griffin, Jones, Brunson, Griffin & Bailey, 2012). Poor oral health contributes to cardiovascular and respiratory disease and may lead to complications in patients with diabetes mellitus. Oral care of the hospitalized patient has been shown to improve eating ability, hydration, and quality of life (Edward, Felstead, & Mahoney, 2012**;** Garcia & Caple, 2013). The provision of oral care has also been demonstrated to reduce the adverse effects of numerous medical conditions including cancer; thus, it is not hard to understand how the regular provision of oral care might improve Patient Satisfaction with Nursing Care.

Skin Integrity. Skin integrity was evaluated using the Braden Scale and the SCDF (Redness Subscale) . The higher the Braden Scale Sore, the lower the risk for pressure ulcer; the higher the SCDF (Redness Subscale), the poorer the Skin Condition.

The mean score for the Braden Scale over the course of the intervention was relatively high (*M = 19.65, SD = 2.30*) and this correlates well with the finding of no referrals to the Wound Care Nurse for newly identified pressure ulcer (HAPUs) during the intervention. Even though the Braden Scale Score was high (the higher the score, the lower the risk), there was still a statistically significant improvement over the course of the intervention and this was observed

to be predicted by PM Infection Control measures, specifically hand washing, glove use, and removal of soiled items.

       The most significant improvement in the Braden Scale Score occurred on Ward 3, which historically had the highest number of patients from general surgery and orthopedics, and post-trauma patients from Afghanistan and Iraq. This finding was encouraging in light of previous anecdotal reports that evacuated patients from Afghanistan had been admitted with Pressure Ulcers.

       The mean scale score for Skin Condition (Redness) (the higher the score, the poorer the skin condition) decreased significantly over the course of the intervention and the greatest decrease (improvement) in Redness score, again, occurred on Ward 3 in the second month of the BTBI. The BBBNC Elements that most significantly explained the variance in Redness were Time (Month in intervention) and AM Linen Care, specifically linen and/or gown change.

       The finding that daily changing and periodic straightening of the bed linens promotes patient comfort and prevents skin breakdown has been previously reported in the literature (Folkedahl, Frantz, & Goode, 2002; Lippincott Williams & Wilkins, 2005; Reddy, Gill, & Rochon, 2006). It is logical that straightening the linens and the patient movement that accompanies linen change (whether bedridden or ambulatory) decreases pressure at bony sites (e.g., sacrum, heel) and improves circulation to the skin and overall patient comfort. Observational and outcomes research around the concept of Interventional Patient Hygiene includes linen and gown change and continues to support these practices (McGuckin, Shubin, & Hujcs, 2008;Vollman, 2006).

       It was interesting to note that the Mean Difference in Braden Scale Score and the Redness Scale Score, although inversely related, were not statistically significantly correlated ($r = -.16, p = .74$). Suggesting that both risk for pressure ulcer and daily skin condition assessment were evaluating different aspect of Skin Integrity and that both are necessary nursing assessments.

       Sleep Quality. Sleep Quality was evaluated using the PSQI (Hours of Sleep question). Number of Hours Slept changed significantly over the course of the intervention with the greatest improvement occurring in Month 3 of the BTBI. Earplugs were only offered 50% of the time and PM Noise Reduction elements were not statistically significantly associated with those months in which sleep did improve. The greatest change in Hours of Sleep was a decrease that occurred in Month 6 of the intervention; the trend towards a decrease in Hours of Sleep began in Month 4 of the intervention. Interestingly, the BBBNC Elements that explained the greatest variance in Hours of Sleep were AM Oral Care and AM ROM. It is easy to see how the timing of these two AM Care interventions could contribute to or reduce the number of hours that a hospitalized patient might sleep.

       Sleep in the hospital can be positively or negatively affected by nursing interventions. One interventional study that used historical controls (N = 161patients pre-intervention and 106 intervention patients) found that an eight-hour quiet time resulted in a significant ($p < .05$) decrease in patient-reported sleep interruptions and a decreased need for sedation (Bartick, Thai, Schmidt, Altaye, & Solet, 2009; Caple & March, 2014). Another intervention study (N=100) that utilized a pre/post design found that earplugs and eye masks promoted sleep and improved patients' overall perception of sleep (Jones & Dawson, 2012).

       Sleep hygiene aims to minimize factors that can disturb sleep. In their systematic review (N = 9 studies) Hellstrom, Fagerstrom, and Williams (2012) found that increased physical

activity during the day increased daytime wakefulness improved nighttime sleep. Conversely, early morning AM Care has been found to decrease the number of hours of sleep and lead to daytime sleepiness and napping (Caple & March, 2014; Missilidine, 2011; Patel, Chipman, Carlin, & Shade, 2008).

  Attention to sleep hygiene was part of the BTBI and BBBNC; however, demonstration of uptake was not apparent. Sleep hours initially improved (Months 1-3 of the intervention); however, the trend towards a significant reduction in hours of sleep started in month four of the intervention reaching statistical significance in month 6 (Time 7). This finding suggests that a booster educational intervention might be advised in month three.

  This project did not suffer from a small sample size or a weak design as is often the case in sleep studies; however, hours of sleep were self-reported. Attention to fully implementing Noise Reduction (sleep hygiene) measures in future interventional research and EBP outcome evaluation projects is necessary (Hellstrom, Fagerstrom, & Williams, 2012).

  Pain Intensity. Pain intensity was evaluated using the NRS (0-10 scale). The mean score for Pain was low over the course of the BTBI (*M = 1.38, SD =1.69*) and did not change significantly from pre intervention (Time 1) to Month 6 of the intervention (Time 7). Pain scores were obtained retrospectively from the electronic health record (EHR) and utilized scores recorded for 0400 and 2400. Pain differences were calculated using these two pain scores. It is possible that these two pain score points in time did not give an accurate view of Pain Difference.

  The Project Team did not collect Pain Intensity Scores that were recorded within one hour of pain medication; pain medication was not a measured independent variable in this project. Pain was not measured within one hour of other types of nursing interventions such as massage. Massage as a nursing intervention has been shown to statistically significantly decrease pain in hospitalized (and institutionalized) patients even when samples have been small (Harris & Richards, 2010; Wolf, Jacobs, Acree, Wilson, et al, 2007).

  The difficulty of measuring nursing contributions to specific outcomes in general and specifically for Pain Intensity has been previously described (Beck, Weiss, Ryan-Wenger, Donaldson, et. al., 2013; Cordts, Grant, Brandt, & Mears (2011). In their review of previous research, which was undertaken to identify gaps in measuring the contributions of nursing to care to patient outcomes, Beck and colleagues identify challenges to outcomes research, specifically, measuring care delivery from multiple perspectives; determining the dose of care delivered; and measuring the entire care process. They recommended the use of meaningful measures that are simple, feasible, affordable, and integrated into the care delivery system and EHR. In their multi-method study of 35 healthcare providers' views of hospitalized orthopedic patient's pain needs, Cordts , Grant, Brandt, and Mears (2011) recommended a cross-disciplinary approach to pain management .

  BBBNC Elements. Research evidence for the effectiveness of the individual elements that together made up the BBBNC have been previously described in the BTBI protocol (please refer to integrated references at the end of this report). Evidence for the continuing use of many of these elements has been demonstrated and has been named Interventional Patient Hygiene (IPH) (McGuckin, Shubin, & Hujcs, 2008;Vollman, 2006). Interventional Patient Hygiene, specifically the provision of evidence-based Oral Care, Mobility, Hand Hygiene (patient and healthcare provider), Perineal Care (urinary catheter care), Skin Care and Bathing have been

demonstrated to be effective in reducing rates of HAIs, and have also been associated with higher levels of patient satisfaction and decreased levels of pain.

The psychometric properties of the 36-Item AM Intervention Documentation Form and the 33-Item PM Intervention Documentation Form are encouraging with K-R 20 Alphas of .83 and .80 for the forms respectively. Further research and utilization of these forms is necessary to provide additional evidence in support of their reliability and validity in acute care, deployed environments, and during enroute care.

 Although the project team was not able to transform (change and add fields) the military treatment facility (MTF) EHR, efforts to improve documentation of basic nursing care elements in the EHR are encouraged. Documentation of this essential nursing care has been shown to improve interdisciplinary communication and collaboration, improve patient safety by organizing and guiding nurses' clinical decision-making, and assist in information synthesis (Englebright, Aldrisch, & Taylor, 2014).

Massage. There is evidence in the literature to support massage to improve Skin Integrity, Sleep Quality, and Pain Intensity (Harris & Richards, 2010; Hellstrom, Fagerstrom, & Willman, 2012; Mehling, Jacobs, Acree, Wilson, et. al., 2007). In this project, massage as part of skin care, was only reported to have been performed during 4.2% of the AM nursing care interventions (N= 9,088) and during 1.7% of PM nursing care interventions (N = 9,088). This finding was not surprising. The EBP Change Champions encountered push back from the nursing staff with regard to massage. Fear of accusations of inappropriate behavior during massage, inadequate training in massage in nursing school and Corps School, and lack of time to perform massage were given as reasons not to perform massage.

Didactic training and simulation were used to educate BTBI nurse participants about "warm lotion back massage", but it was apparent from the data that the [lack of] performance of back massage remains a concern. One reason for this may be the increasing complexity of hospitalized patient care. In one project intended to develop a hospital-based massage therapy course, program managers reported that complicated medical conditions required additional training in order for massage to be safe and effective (Dion, Cutshall, Rodgers, Hauschulz, et.al., 2015).

Objective 2. Perform a Feasibility Evaluation of the BTBI and BBBNC.

Feasibility Evaluation. Evaluating the degree to which critical elements of an intervention were implemented can avoid incorrect conclusion about the intervention's effectiveness due to inadequate implementation (Windsor, Clark, Boyd & Goodman, 2003). The desired Process Implementation Index was .80, which is indicative of a well-run project/intervention. The PII for this project was .76, indicating a satisfactorily run project. Only elements identified as critical to the implementation and evaluation of the BTBI and the BBBNC elements by the project team were included.

Process evaluation that documented the level of patient participant exposure to each core program procedure was critical, and in this project took the form of nursing staff documentation of the basic nursing care elements that made up the BBBNC. Documentation of exposure to the BBBNC was especially important to avoid making what has been referred to as a Type III error.

A Type III error occurs when researchers and project evaluators assume that an intervention was delivered as intended when in it reality was not (Windsor, 2003; Ward,

Windsor, Atkinson, 2012). This type of error is especially problematic for healthcare-related projects delivered in nonstandardized ways and that vary with location, facilitators, and participants. Although the BTBI and BBBNC were standardized, the BTBI was delivered on three Wards with a variety of facilitators and nursing staff participants. Future evaluations of the BTBI and BBBNC should include an evaluation of nursing staff documentation quality and completeness as one of the critical elements essential to evaluate effectiveness and prevent a Type III Error.

   The Nursing Process Monitor indicated that the nursing staff that participated in the BTBI training felt prepared and supported to provide the intervention using the BBBNC; barriers specific to the MHS were encountered. These obstacles will continue to provide challenges to the evaluation of the effects of new methods of delivering care over time. Sustainability is a problem when it is reliant on individual by in, particularly in a hierarchical healthcare system with mobile healthcare providers. Multiple requirements and competing priorities for military healthcare providers will continue for the near future. Adoption of institutional and organization-wide policies and procedures will address sustainability of nursing practice innovations.

   The section below entitled, "Effect of problems or obstacles on the results" further explicates the feasibility of the project: "An Evidence-Based Practice Protocol: Back to Basics Bundle of Nursing Care".

Objective 3. Perform a Cost Analysis of the BTBI and BBBNC.

   Cost Analysis. Cost analysis relied on secondary analysis of data on "newly acquired" pressure ulcers known as Hospital Acquired Pressure Ulcers (HAPU) and Healthcare Associated Infections (HAIs). Patients that were admitted with pressure ulcers were not included in the numbers; therefore, there were pressure ulcers that were identified and cared for during the intervention, but they did not meet the definition for HAPUs.

   It was encouraging that no new pressure ulcers developed during the course of hospitalization for the same period the year before and during the seven-month data collection period for this project on any of the three Medical-Surgical Wards. It was also interesting to note that "Redness" was identified using the SCDF; and Redness, if nonblanching, may be an indication of a Stage 1 Pressure Ulcer. The mean score for Redness decreased significantly over the course of the BTBI.

   Reportable Healthcare Associated Infections (HAIs) did decrease compared to the same period the year before but this decrease did not reach statistical significance. Although the numbers did not reach statistical significance, they did reach clinical significance. HAIs are associated with morbidity (and mortality) and can extend a patient's hospital stay by one-half to one full day or more (Scott, 2009; Strouse, 2015; UC Berkley, 2013).

   As discussed by McGuckin and Waterman in their 2008 editorial comment on results related to interventional research and HAIs, there is a difference between "did not detect a change" and "there was no change" (McGuckin & Waterman, 2008). Because there were so few infections in each year, the power of this small sample to detect a change, even a 55% decrease from Time 1 to Time 2, was only 40%.

   Authors of a Cochran systematic review of four randomized clinical trials conducted between 2006 and 2009 and published in 2010, reported that hygiene intervention studies and their effectiveness in decreasing HAIs were fraught with design problems; no significant decrease in infections was reported in any of the studies (Gould, Moralejo, Drey, & Chudleigh,

2010). This was, according to the authors, partly due to the multiple interventions that were occurring simultaneously, making it difficult to know what in fact affected the outcome. This speaks to the need for detailed process implementation evaluation as previously described.

The findings from the Cochran review above were born out in the literature search for current research reports for this discussion. In one 2013 ecological study that was performed in Ontario between 2008 and 2011 and utilized a time-series design (N=166), the implementation of a hand hygiene intervention did decrease the incidence of HAIs, but again it did not reach statistical significance (DiDiodato, 2013).

In southern California, The Berkley Memorandum was published in 2013. This secondary analysis of data utilized information reported to the California Department of Public Health that California hospitals were required to submit on HAIs. This memorandum suggested that an estimated 5% reduction per year in HAIs as the result of multiple interventions measures was realistic.

The cost to treat an HAI varies by patient demographic, acuity, and the infecting organism's specific characteristics. In 2010, the average cost for one HAI for a patient hospitalized in southern California ranged from a low of $9,600 for MRSA to a high of $33,400 for catheter related blood stream infections (UC Berkley, 2013).

There were no reported increased direct costs to deliver the BTBI. If the decrease in HAIs from 2009 to the same period in 2010 (from 20 to 11 infections) was due even in part to the BTBI's attention to the Interventional Patient Hygiene (i.e., Oral Care, Bath, Skin Care, ROM, and staff and patient hand hygiene measures) delivered as part of the BTBI and BBBNC, the intervention saved the MTF money. Using the possible 5% decrease in number of HAIs attributable to interventions, that translates to one infection averted from the previous year; thus, the BTBI and the associated BBBNC elements may have saved somewhere between $9,600 and $33,400 over the 7 month period for which data were collected.

Effect of problems or obstacles on the results

Funded by the TriService Nursing Research Program (TSNRP), the Basic Bundle of Nursing Care (BBBNC) protocol was implemented on three medical-surgical units in a tertiary care military teaching hospital from October 2009 to October 2010. The Change Champions faced many challenges and had to adapt to a changing military environment in order to optimize the process and ensure the successful adoption of practice change.

Obstacles to the successful implementation and evaluation of EBP projects, specifically the BTBI and BBBNC, could have been organized in a variety of ways. Final analysis of the obstacles resulted in reporting by the topical headings: Issues Unique to the Military Healthcare System (MHS), Communication, and Data Access and Quality.

Military Healthcare System (MHS). Problems encountered during the implementation and evaluation of this project were similar to those reported in previous EBP implementation projects completed within the Department of Defense's Military Healthcare System (DoD MHS) (Kelley, 2010; Kenny, Richard, Ceniceros, & Blaize, 2010; Mark, Latimer, & Hard, 2010; Titler & Moore, 2010). Military hospitals share organizational characteristics that make them unique. These characteristics may contribute to or block the diffusion and sustainment of EBP innovations. Characteristics that may block the successful implementation of an innovation include the related issues of competing time demands and priorities (e.g., wartime primacy) and staff turnover due to deployments, reassignments, and attrition.

During preliminary work and creation of this EBP project, it was peacetime. As the grant was submitted, there was an increased focus on the wartime healthcare support mission, which took key EBP team members way from the military treatment facility (MTF) to deployed settings. The wartime focus delayed the funding of the grant application and the deployments of key EBP team personnel further delayed the project start. In addition, regularly scheduled staff transfers to other duty stations affected much of the EBP team including key team members (i.e., Opinion Leaders, Change Champions, and Change Agents); these key personnel were promoted and transferred or retired.

Within the military healthcare system, there is a constant influx of new staff. It is estimated that, "on average, 33 % of military nurses are transferred annually" (Kelley, 2008, p. S1). This influx of new staff includes hospital leadership across all disciplines. As new personnel joined the BTBI EBP team, they required training and outreach. Transfer of key leadership from multiple directorates required frequent executive leadership briefs.

Unique MTF staffing also affected this project. During the preliminary work and application process, there were two dedicated doctorally prepared nurse researchers devoted to the project. The research department was fully manned (i.e., 3 doctorally prepared nurse scientists) at the start of this project. By the time funding was received, two of the nurse researchers had been transferred without replacement. This staffing turnover put a strain on the one remaining military nurse scientist; however, there was consistent military headquarters and MTF nursing leadership support for the project. This support went a long way towards keeping the BTBI team energized and effective.

Time constraints have been identified as an ongoing challenge to EBP project efforts in military treatment facilities (Kelley, 2010; Mark, Latimer, Hard, 2010). On average, it can take 30-36 months to institutionalize practice changes due to shifts in staffing, obtaining buy-in from administration, reviewing human research ethics (if required) and implementing and evaluating practice change (Kelley, 2008).

In this project, the need for a Cooperative Research and Development Agreement (CRADA) delayed the start letter by seven months. A CRADA is a written agreement between a federal research organization and one or more federal or non-federal parties (collaborators) to work together as partners on a research project of mutual interest (Department of the Interior, 2015). On average, the CRADA process takes three months, but can vary considerably (Naval Research Laboratory, 2015). The requirement for a CRADA, together with the need for continuous training, team building, briefing, and supply and facilities issues delayed implementation of the BTBI and at times stifled EBP team momentum, and clinical uptake and sustainment. These delays resulted in several requests for funded and no-cost grant extensions.

Communication. As recommended by previous military EBP nursing pioneers (Kenny, Richard, Ceniceros, & Blaize, 2010; Mark, Latimer, & Hardy, 2010), ongoing communication with key staff (i.e., nurse managers and administrators) was achieved weekly. Methods of communication included Ward meetings (formal and walking around), email updates, memorandums, and Board of Director's briefs. Additional communication efforts took the form of written policies and procedures. Marketing efforts included the creation of the Back to Basics Logo (Figure 1), a formal ribbon cutting ceremony, and several poster and podium presentations.

Not all directorates and departments were included in the initial team-building and informational leadership briefs. It became apparent after initiation of the BTBI that the Supply and Facilities Departments were important to the success of the intervention. As the intervention

Wards transitioned from the traditional pink basin bed bath to evidence based bath wipes, face-to-face meetings and executive briefs with departmental leadership were necessary to rectify misinformation about the intervention items. These discussions proved critical to the adaptation and adoption of this protocol. Without the evidence-based bath cloths, the ability to move forward with the BTBI would have been stymied.

Regular and consistent communication with staff members from Infection Control and Nursing Informatics was necessary in to obtain data for analysis, specifically reported HAPUs and HAIs. Bi-monthly meetings were initiated; however do to small staffs and competing priorities, scheduling these bi-monthly meetings proved difficult at best and is related to the next section on access to and quality of data for analysis.

Figure 1
Back to Basic Logo

Note. Logo developed by G. Redd for the BTBI
and BBBNC. Approved by NMCSD PAO 9/2014
for TSNRP Research & EBP Dissemination
Conference podium presentation, San Antonio, TX

Data Access and Quality. Documentation of the basic elements of nursing care was the single most important facilitator of as well as barrier to the evaluation of the BTBI. The adage, "If you didn't document it, it wasn't done" holds true for research and evidence-based practice projects as well as for the medical-legal system. The use of the EHR was part of the original EBP project plan and would have gone a long way to clarify and document basic care elements. In one descriptive study by Englebright, Aldrich, & Taylor (2014), the use of the EHR did in fact clarify and document basic nursing care. In this study, the use of the EHR for documentation would also have improved communication between and "uptake" of the essential basic elements of care by the nursing staff. Unfortunately, the use of the EHR for documentation was not possible by the time the project was funded (as was originally intended and agreed upon) because contractors changed and the cost to make changes to the EHR had become significant.

Linking the protocol to patient outcomes was essential to enthusiasm for the BTBI and documentation of the BBBNC elements. In order to keep nursing staff focused and energized around the task of accurate documentation, The Nursing Research Department staff instituted daily audit and feedback mechanisms. The PD and Research Nurse communicated daily with the Charge Nurses on each Ward. Friendly competitions were initiated between Wards and shifts for highest percent reporting and completion of nursing care and documentation. Although a

necessity, the hard-copy documentation forms did also serve as ever-present prompts to remind staff of the essential elements of the BBBNC.

Challenges to data access and quality also included unanticipated physical plant repairs and upgrades, specifically the remodeling of the heat and air conditioning systems on each intervention Ward. Staff and patients affected by upgrades had to be relocated to other Wards and this resulted in blending of patient types and staff. This blending of staff and patients may have affected statistical results when analyzed by Ward, diluting, and effectively reducing the effect sizes of nursing interventions on patient outcomes; therefore, results by Ward were not described in as much detail as planned.

In February 2012, much of the ongoing data analysis for the project was lost due to server problems at the MTF. For security reasons, thumb drives and back-up drives were/are not allowed at MTFs. Fortunately, raw data had been stored on a computer that was not affected by the hospital-wide server problem. Despite valiant efforts, little of the analysis was recovered and the PI had to reenter data, re-perform the majority of the statistical analysis, and recreate all of the tables. It is noteworthy that the individuals that had previously performed as AI, PD, research assistants, and consultants provided "no cost" assistance with some of the rework.

Limitations

The strength of quasi-experimental designs such as the multiple time series design (nonequivalent comparison groups) used in this project is that they are practical; however, because they lack random selection and/or assignment, there may be several rival explanations for findings (Polit & Neck, 2012). Lack of random assignment relates to threats to the internal validity.

Internal Validity. Threats to internal validity in this project included temporal ambiguity, selection, history, maturation, and testing. Attrition was not considered a threat in this project because the sample was a census sample and the data were reported in aggregate; Ward means were not dependent on individual comparisons at each measurement point.

The temporal ambiguity threat to internal validity was addressed in the repeated measures design. The intervention preceded the change and pre-intervention data were available for reference.

The selection threat to internal validity was considered very real; each Ward historically serving different patient populations. In this project, the design was intended to allow each Ward served as its own control; thus, beginning to address issues of confounding by allowing homogenous groups to be evaluated for change over time. Unfortunately, major repair issues took place during the intervention and there was mixing of patient types and staff. This resulted in greater heterogeneity of each Ward.

Data were collected over time, thus addressing the threat of history and helping to rule out some of the alternate explanations for change (i.e., those not having to do with the BTBI and BBBNC elements). Related to the data collection over time was the maturational threat that was very real and became obvious in the apparent fatigue of nursing staff related to documentation of care elements on the paper instrument in addition to the requirement to document nursing care in several areas of the electronic nursing note.

The majority of the data collected for this project were self-reported and documented by the nursing staff. The most serious concern for this self-reported data was the accuracy of the reports found in the basic nursing care documentation. Nursing staff may have wanted to be seen

as "doing all the right things" and not forgetting anything, and this may conflict with the truth. Additionally, the paper documentation form was not a legal document and did not carry the same "legal" weight as the EHR. As previously discussed, this may have resulted in a Type III Error in which results are attributed to the intervention when in fact they were not a result of the intervention.

The instrumentation threat was addressed by attempting to ensure that documentation took place; however, as previously described, the contractor changed after the grant was submitted and resulted in the original plan, making additions and changes to the electronic nursing note, no longer being possible. A paper data collection tool was then implemented; however, this additional step in documentation for the nursing staff may have negatively affected the feasibility and sustainability of the documentation of BBBNC elements.

External Validity. There were few threats to this project's external validity. Because the patient participants constituted a census sample over a seven-month period, they were representative of the Medical-Surgical population at this military medical center in southern California. The multiple time series design allowed each intervention Ward to act as its own control and allowed realism to take place, "the real world is messy" (Polit & Beck, 2012). Adequate detail has been provided in the BTBI grant protocol methods section, Train-the-Trainer Manual and DVD created during and for this project so that it could be replicated and improved upon. The results of this project can be generalized to other similar patient populations and military treatment facilities.

Conclusions

The Primary Aim of this project was achieved. The development of the Evidence-Based Practice Protocol: The Back to Basics Basic Bundle of Nursing Care (BBBNC) was advanced.

An Effectiveness Evaluation of the Back to Basics Intervention (BTBI) and associated BBBNC was performed. BBBNC elements that were found to be most effective were those that were carried out during AM and PM Oral Care, AM Linen Change, and Infection Control (hand hygiene, glove use, and removal of soiled items). Patient Outcomes of Interest that significantly changed over the course of the intervention were Skin Integrity as evaluated by Risk for pressure ulcer (Braden Scale Score) and Skin Condition (SCDF Redness Subscale Score), Hours of Sleep, and Patient Satisfaction with Nursing Care. Pain Intensity decreased over the course of the intervention but did not reach statistical significance. Reported HAIs decreased from the same period for the previous year but the change did not reach significance. There were no reported HAPUs during the BTBI and for the same period the year before.

Initial analysis of the BBBNC AM and PM Intervention Documentation Forms provides evidence in support of their reliability and validity. Additional evaluation across services, in deployed settings, and during enroute care is required.

A Feasibility Evaluation of the Basic Bundle of Nursing Care was performed. The PII for this project was .76; indicating a satisfactorily run project. It is very possible that not all elements critical to the evaluation of the feasibility of the BTBI and BBBNC were included, the most obvious being a measure of quality of the documentation of basic nursing care.

Issues specific to the MHS may affect the feasibility and sustainability of nursing interventions including competing wartime and peacetime priorities and frequent staff turnover. These challenges affected the timeline for implementation of this project. Documentation of basic nursing care is a continuing challenge for both military and civilian healthcare facilities and

effects not only the communication of patient care but also the evaluation of nursing care's contribution to patient outcomes.

A Cost Analysis of the Basic Bundle of Nursing Care Intervention was attempted. Methodological problems that have been noted in other hygiene intervention evaluations affected the quality of the cost analysis in this project. These issues included multiple types of interventions occurring simultaneously and small numbers of reported HAIs. Despite these challenges, it is possible that the intervention resulted in a cost benefit through infections averted. Efforts to improve the accuracy and specificity of cost analyses should be undertaken in future evaluation research and EBP projects.

Limitations to the study design were described. The most serious threat to internal validity was instrumentation with regard to nursing documentation of basic nursing care. Despite the threats to internal validity, external validity was considered good and the results of this project can be generalized to other similar patient populations and MTFs.

The results of this study have significance to military nursing practice, policy, research, and education. They highlight the continuing need to provide fundamental basic nursing care in order to positively affect patient outcomes. Documentation challenges are a reoccurring theme in research studies and EBP projects. Sustained efforts by nurse leaders are necessary to address these difficulties. Policies and procedures that standardize the practice and documentation of basic nursing care are needed across services.

This EBP project has addressed a significant gap in evaluation of basic nursing care elements and their effect on patient outcomes. As of this writing, no similar project has been reported in the literature. Research studies and EBP activities that improve upon this project are needed. Recommendations for future research have been described and include replication and piloting of the BTBI and BBBNC protocol in shipboard environments, field environments, and during medical evaluation (enroute care). Additionally, evaluation of the level of Nurse Satisfaction with patient care specific leadership decisions on the implementation of and quality of documentation of patient care innovations is recommended. Finally, focused cost benefit analysis of nursing interventions as they relate to patient outcomes in any cross-departmental or directorate EBP project should be performed.

Significance of Study or Project Results to Military Nursing

The results of this study are significant to and have implications for military nursing practice, policy, research, and education. The results of this study have addressed a gap in military (and civilian) nursing research.

The results of this study are significant to military nursing clinical practice. They highlight the continuing need to provide fundamental basic nursing care in order to positively affect patient outcomes. The timing of nursing interventions is important to the patient's experience; outcomes may be negatively affected in some cases (i.e., Hours of Sleep). Efforts should be made to measure the contribution of nursing care to patient outcomes even if that measurement is complex. This project has demonstrated nursing care contributions to Skin Integrity, Hours of Sleep, and Patient Satisfaction with Nursing Care as well as a possible effect on Healthcare Associated Infections.

The results of this study are significant to military nurse leaders and managers. The effect of the attitudes of nurse leaders and managers cannot be under estimated because they and their physician and allied health colleagues can promote or prevent the successful implementation and evaluation of nursing innovations. Without their continuing support and "cheer leading" efforts, EBP projects in general, and specifically those that cross directorates, hospitals, and services could not be done. Documentation challenges are a reoccurring theme in research studies and EBP projects. Continuing efforts by nurse leaders are necessary to address these difficulties.

Professional schools of nursing are spending little if any time educating nursing students about the provision and importance of basic nursing care; thus, this education becomes the responsibility of MTF. Staff Education and Training Departments, Nurse Internship Programs, Nurse Educators and Clinical Nurse Specialists will play a large role in these educational efforts. Corps School training has been provided in a TriService environment since 2009; therefore, cross-service dissemination of BTBI and BBBNC educational efforts should prove to be less complex. The dissemination of standardized information across services will also make the evaluation of the effect of the delivery of basic care elements on patient outcomes more feasible during enroute care and in deployed settings.

Policies and procedures that standardize the practice and documentation of basic nursing care are needed across services. Efforts to this end, to standardize basic nursing care and its documentation in the electronic record, are ongoing.

This EBP project has addressed a significant gap in evaluation of basic nursing care elements and their effect on patient outcomes. As of this writing, no similar project has been reported in the literature. Research studies and EBP projects that improve upon this study are needed and are expanded upon in the following section.

Recommendations for future research and EBP projects

The following recommendations are provided in order to address EBP project generalizability, identified gaps in research and EBP, and system issues affecting EBP.

In order to enhance generalizability of finding of this type of EBP project, investigators and Change Champions are encouraged to:
1. Replicate the project at other MTFs using lessons learned (e.g., incorporating Booster Training and evaluating its effect on Staff Knowledge, Attitudes, and Outcomes).

2. Gather additional evidence in support of the reliability and validity of AM and PM Care Intervention Documentation Forms.
3. Pilot the BTBI and BBBNC protocol in shipboard environments, field environments, and during medical evaluation (enroute care); evaluate the Feasibility and Effectiveness of the BBBNC Protocol during medical evacuation (enroute care).

In order to address the identified gaps in research and EBP, investigators are encouraged to:
1. Answer the following questions:
   a. "What is the effect of "Others" on the provision of the EBP project/intervention; who is the identified "Other"?
   b. "What is the effect of a specific nursing intervention on reported level of Pain Intensity"?
   c. What are the barriers to the provision of massage during basic nursing care; and how can those barriers best be addressed?
2. Evaluate the effect of:
   a. Sleep intervention studies on sleep quality that utilizes a sample of hospitalized patient outside of the intensive care unit.
   b. Provision of Oral Care (and other basic nursing care elements) in areas of the hospital other than intensive care settings and the effect of that care on Patient Satisfaction with Nursing Care.
   c. EBP Skin Care interventions that consistently implement warm lotion back massage on Skin Integrity; identify and address barriers to the provision of massage in the MTF.
   d. Nurse Satisfaction with leadership-directed patient care decisions and the "carry-over" of these leadership decisions into practice (i.e., on specific care interventions).
   e. Nurse Satisfaction on documentation practices in general and documentation of basic elements of care specifically.
3. Perform focused cost-benefit analysis as one component of any EBP project.

In order to address social system issues in EBP and research, investigators are encouraged to answer the following questions:
1. Do purchasing alliances discourage the implementation of innovation and the translation of research into practice?
2. What is the effect of a materials management program, specifically, a regional hospital [purchasing] alliance (REHA) on the cost to deliver evidence based health care (person-hours, space, additional costs to purchase outside of alliance, space to store, and product evaluation)?

Changes in Clinical Practice, Leadership, Management, Education, Policy, and/or Military Doctrine that Resulted from Study or Project

The EBP culture was informed by and/or changes were initiated or instituted as the result of this project. At the MHS level, the TriService working group (CAG Clinical Advisory Group) on Eccentris was informed by findings from the BTBI and BBBNC; recommendations included new and revised fields in electronic nursing note. At the Navy Nurse Corps level, nurse researchers formally report involvement in research/research utilization/EBP projects, and research education, and grant applications. At the MTF level, 20 nursing staff, including clinical nurse educators, clinical nurse specialists, nurse administrators, and bedside nursing staff (RNs, LVNs, Corpstaff) were formally educated in a two and one-half day Evidence Base Practice Project Course. Conducted by Dr. Marita Titler, this course provided education for the key military and civilian nursing personnel; thus adding to and fortifying the Navy Nurse Corps and MTF EBP mentor and provider cadre. A Lean 6 Sigma Black Belt was put in charge of a project to improve the MTF CRADA process. The committee on nursing policies and procedures became EBP focused; evaluations of this committee included mention of participation in EBP practice, use of guidelines, and involvement in journal clubs. The DVD, "The Back to Basics Bundle of Care Trainer Course" was developed, has been shared with the Army Nurse Corps, and is still in use by the MTF. Finally, at the individual level, nurse researchers have become formal EBP mentors and Navy Nurse Corps' strategic goal leaders.

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*This is an integrated reference list. New references for the final report are bolded.

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Summary of Dissemination

Type of Dissemination	Citation	Date and Source of Approval for Public Release
Published Abstracts	Abstract: Development of the Evidence-Based Protocol: The Back to Basics Bundle of Care, Iowa City, Iowa, May 2012	NMCSD PAO TSNRP Executive Director
Podium Presentations	Phyllis J. Veronica April 2010 Back to Basic: An Evidence Based Initiative Podium (Power Point) Presentation "Feasibility of and Challenges to Implementation of the Evidence Based Protocol: The Back to Basics Bundle of Nursing Care " 2014 TriService Nursing Research Program (TSNRP) Research and Evidence Based Practice Dissemination Course in San Antonio, Texas, 15 September 2014. Podium (Power Point) presentation	NMCSD PAO TSNRP Executive Director

Poster Presentations	Karen Reider Federal Nursing Poster Presentation, November 2009 Award Winning EBP Poster Development of the Evidence-Based Protocol: The Back to Basics Bundle of Care, Iowa City, Iowa, May 2012 .	
Other	Back to Basics Bundle of Care Train-the-Trainer Course DVD May 2009 (still in use at Naval Medical Center San Diego; shared with Army Nurse Corps 2010)	NMCSD PAO TSNRP Executive Director

Reportable Outcomes
Recruitment and Retention Table

Recruitment and Retention Aspect	Number
Patient Participants Projected in Grant Application:	
(333 admissions x 7 months = 2331 admissions) +20%	2,797
Individual Patient Participants	2,589
Patient Participants Consented (Waiver of consent approved by IRB)	N/A
Nursing Staff Participants Projected	Census
Nursing Staff Participants	48
Nurse Participants Consented	48
Patient Participants Ward 1	911
Patient Participants Ward 2	459
Patient Participants Ward 3	1,219

Recruitment and Retention Aspect	Number
Medical or Data Registry Records Available (reflects 30% record screen for Braden and Pain Scores)	776
Medical or Data Registry Records Screened	776
Subjects With Complete Data	776
Subjects with Incomplete Data	0

Demographic Characteristics of the Sample

Characteristic	
Age (yrs)	54.20 ± 0.54
Women, n (%)	1146 (44%)
Race **(Not collected)**	
Military Service or Civilian **(Not collected)**	

Final Budget Report

<div align="center">

The Geneva Foundation
Summary Budget Comparison - Unposted Transactions Included In Report
1136 - 1136-EBP-BACK TO BASICS BUNDLE OF NURSING CARE
From 4/1/2015 Through 4/30/2015

</div>

Account Code	Total Budget - PROJECT BUDGETS	CURRENT PERIOD ACTUAL	TOTAL EXPENSED TO DATE	Total Budget Variance - PROJECT BUDGETS
CONS	7,800.00	0.00	5,540.00	2,260.00
INDR	41,032.00	0.00	40,350.91	681.09
OTHR	36,303.89	0.00	36,303.89	0.00
PERS	156,286.84	0.00	156,286.48	0.36
SUPP	965.99	0.00	492.28	473.71
TRAV	4,833.28	0.00	4,145.72	687.56
Report Difference	(247,222.00)	0.00	(243,119.28)	4,102.72

Linnea M. Axman

Digitally signed by Linnea M. Axman
DN: cn=Linnea M. Axman, o=Naval Medical Center San Diego, ou,
email=linneaaxman@gmail.com, c=US
Date: 2015.06.01 15:07:24 -07'00'